



Exploring Vertical Asymptotes

Student Activity

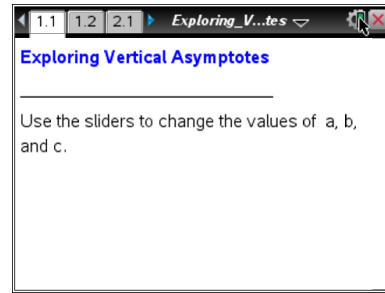


Name _____

Class _____

Open the TI-Nspire document *Exploring_Vertical_Asymptotes*.

Given the equation of a rational function, will you always be able to determine the domain? In this activity, you will explore vertical asymptotes and removable discontinuity.



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1. Use ▲ and ▼ to change the value of a . Describe how the graph changes.
2. Use ▲ and ▼ to change the value of b . Describe how the graph changes.
3. What do the values of a and b represent in the function?
4. What are the equations of the vertical asymptotes?
5. State the domain of the function in terms of a , b , and c .
6. Use ▲ and ▼ to change the value of c . How does changing c affect the domain?
7. Describe how you could find the vertical asymptotes for any rational function with a constant numerator.

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8. Use ▲ and ▼ to set $a = 2$ and $b = -1$, and then change the value of c . For which values of c are there no asymptotes? Explain why there are no asymptotes for these values of c .



9. The “hole” in the graph is called a removable discontinuity. Explain why the hole exists and how you might remove it by modifying the function definition.

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10. Answer the question on Page 2.2.

Describe the graph of the function $y = \frac{(x+6)(x-3)}{x+6}$.

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11. Use ▲ and ▼ to set $b = -1$ and $c = 4$. Then use ▲ and ▼ to change the value of a .
- Describe how the graph changes as the value of a changes.
 - What is the domain of the function in terms of a , b , and c ?
 - For which values of a is there only one asymptote? Describe the graph at these values.
 - Explain algebraically why the graph looks as it does at these points.
12. Describe how the domain would change if you changed the values of b and c .

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13. Answer the question on Page 3.2.

Describe the graph of the function $y = \frac{x-3}{(x+6)(x-3)}$.